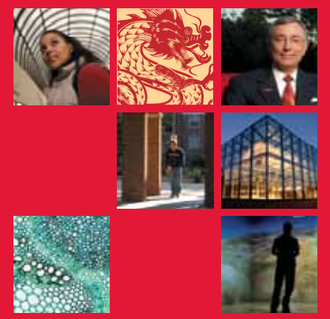
IOWA STATE UNIVERSITY

# Where Breakthroughs Happen.

Iowa State University // President's Report



IOWA STATE UNIVERSITY // www.iastate.edu
Ames, Iowa

# a letter from the president

Important breakthroughs are happening every day at Iowa State University. Why? Because we have created the right environment: a campus that welcomes adventurous minds, a community that provides support and encouragement, and a place that wants to know the unknown.

At Iowa State University, we have been creating such an environment for almost 150 years.

Our tradition of innovation and discovery is deeply rooted. After all, this is where the first electronic digital computer was built, where the first graduate degree in engineering was awarded, and where biotechnology has been studied for more than a century.

This tradition has created a university where we push the boundaries of knowledge, seek amazing new discoveries, and make the impossible possible.

Building on our accomplishments – including an outstanding accreditation review by the Higher Learning Commission; groundbreaking discoveries in the biological, materials and information sciences; and stellar accomplishments by our faculty, staff and students – we have outlined bold new steps to achieve greater success in our academic efforts and service to society. This boldness is evident in our new Strategic Plan; it is evident in our plans for our next major fund-raising campaign; and it is evident in the ideas for new initiatives that our administration, faculty and staff are putting forward.

The sequencing of the corn genome will improve plant breeding and increase the availability of new sources of energy. The sequencing of the swine genome can give medical researchers new insight into treating diseases such as diabetes and heart disease. The most lifelike virtual reality facility in the world will help urban planners better manage population growth in cities around the world. And developing a new bioeconomy will mean improvements around the world.

These are just a few things Iowa State University will add to our list of accomplishments, because the research to make them all a reality is taking place on our campus today.

I am pleased to provide you with this copy of the President's Report. The stories contained here look back at recent accomplishments and breakthroughs at Iowa State University, and ahead to an even brighter future. Whether it's research in our laboratories or education in our classrooms, success on the athletic field or growth in support for our university, these are exciting stories to share.

From groundbreaking research to a great education, this university has created an environment for breakthroughs. Thank you for learning more about Iowa State University.

Warmest regards,

Gregory L. Geoffroy
President

November 2006

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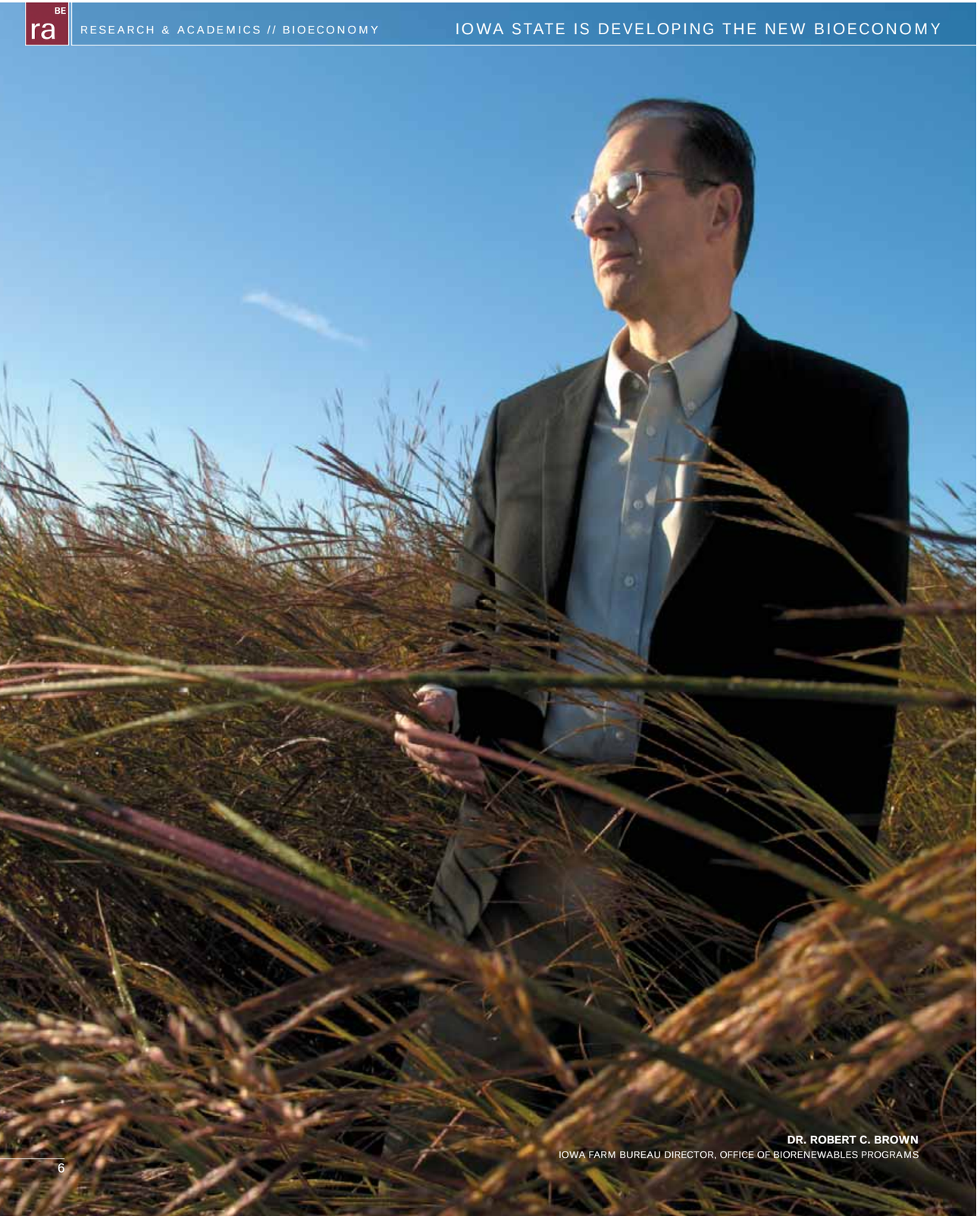
# WHERE BREAKTHROUGHS HAPPEN.

AT IOWA STATE UNIVERSITY, BREAKTHROUGHS HAVE BEEN HAPPENING FOR NEARLY 150 YEARS. LEADING US TO NEW DISCOVERIES ... SEEKING THE UNKNOWN ... REWARDING CURIOSITY ... MEETING CHALLENGES HEAD-ON ... ENCOURAGING NEW IDEAS ... PURSUING INNOVATION.

IOWA STATE UNIVERSITY IS HOME TO MORE THAN 25,000 STUDENTS AND 1,700 FACULTY, EACH OF THEM PURSUING THEIR OWN ADVENTURE IN EDUCATION. WITH SO MANY GREAT MINDS IN ONE PLACE, WE HAVE THOUSANDS OF STORIES TO SHARE.

THESE ARE JUST SOME EXAMPLES OF THE PEOPLE AT IOWA STATE UNIVERSITY AND THEIR WORK THAT IS MAKING A DIFFERENCE, HERE AT HOME AND AROUND THE WORLD.



DR. ROBERT C. BROWN
IOWA FARM BUREAU DIRECTOR, OFFICE OF BIORENEWABLES PROGRAMS



**REDUCING THE RELIANCE ON FOSSIL FUELS. IMPROVING THE ENVIRONMENT. STRENGTHENING THE ECONOMY.** REVITALIZING RURAL AMERICA. MAKING A DIFFERENCE ON ANY ONE OF THESE ISSUES IS A MAJOR ACHIEVEMENT. DOING SOMETHING ABOUT ALL OF THEM CAN CHANGE THE WORLD. THE UNIVERSITY'S BIOECONOMY INITIATIVE BEGAN WITH A SIMPLE BUT AMBITIOUS MISSION: TO DEVELOP RESEARCH, EDUCATION AND PROGRAMS THAT WOULD PROMOTE GREATER USE OF BIORENEWABLE RESOURCES. TODAY, THE OFFICE OF BIORENEWABLES PROGRAMS IS A UNIVERSITY-WIDE EFFORT THAT IS DEVELOPING THE NEW BIOECONOMY.

# Q&A

## WITH ROBERT C. BROWN

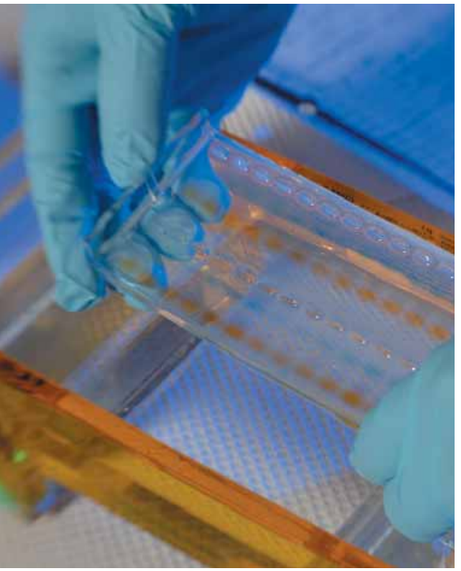
The holder of eight patents and an R&D 100 Award from *R&D* magazine, Robert C. Brown is helping lead the effort at Iowa State University to develop the new bioeconomy. With appointments in three engineering departments, Dr. Brown serves as the Iowa Farm Bureau Director of the Office of Biorenewables Programs. He discusses the research taking place at Iowa State University and the impact it might have around the world.

Q: Rising gas prices have meant more attention for ethanol and biodiesel, but isn't the bioeconomy much more? What other possibilities should people be excited about or look for in the future?

Brown: I often refer to our program as "renewable fuels and more." People recognize that imported petroleum is used to produce transportation fuels but often overlook the extraordinary extent that petroleum-based products permeate our society. They are hard to avoid: carpets, paints, lubricants, fabrics, small appliances, kitchen utensils, to name a few, typically contain large amounts of petroleum-based chemicals. In principle, we could replace all of these with biobased chemicals or materials. In fact, Iowa State characterizes the bioeconomy as nothing less than a revolution in the way society obtains its essential sources of carbon and energy.

Q: If you could fast-forward ten or twenty years, what differences or improvements would you like to see, as a result of Iowa State University's research, in the state, the nation or around the world?

Brown: When you ask business leaders why they move their manufacturing overseas, they respond that they are "going where the resources are." In a bioeconomy, the resources are located in Iowa and other agricultural states, so in ten or twenty years I would expect to see the manufacturing base in Iowa expand. Biorefineries are investments of $100 million or more, and dozens will be built. On the other hand, California's Silicon Valley didn't emerge where it did because "that is where the silicon was." Like technology companies in the Silicon Valley, many biorenewables entrepreneurs will set up shop in close proximity to universities specializing in the intellectual knowledge



# diverse research to meet diverse needs.

The bioeconomy initiative is diverse in scope, examining a wide range of new uses for the food and fiber produced in America. Research under way at Iowa State University includes:

- Recycling nutrients between biorefineries and bioenergy plantations
- Growing medicines in corn kernels
- Fermenting sugars into commodity chemicals
- Using natural fibers to produce building materials
- Breeding soybeans into better biofuels
- Replacing natural gas in ethanol plants
- Converting plant fibers into biopolymers
- Using switchgrass for the production of ethanol
- Using ultrasound to squeeze more ethanol from corn
- Creating biobased polymers from a biodiesel byproduct
- Replacing petroleum-based chemicals with enzyme-laced water systems to process soybeans
- Using corn-stover biomass to produce a nitrogen-rich substance that enriches the soil and removes carbon from the air
- Converting the corn fiber used to develop animal feed into ethanol fuel
- Developing soy oils as the basis for biobased lubricants
- Using metabolomics to find ways to improve oils, starches and proteins derived from corn and soybeans

and skills that can advance the bioeconomy as well as provide their companies skilled workforces. I hope that a "biorenewables prairie" emerges in Iowa as the engine of long-term economic growth, with an impact stretching well beyond its own borders.

Q: Are there qualities or opportunities that make Iowa State University a unique place to conduct biorenewables research?

Brown: Two things make this a unique place to conduct this work. First, Iowa State is located in the middle of the rapidly growing renewable fuels industry. We have ready access to both the producers of biorenewable resources and the manufacturers of renewable fuels. We understand this new industry better than most. Second, Iowa State has adopted an integrated approach to biorenewables. We engage faculty across many disciplines to simultaneously tackle the roadblocks to commercializing new biobased products. Very few schools have been able to organize their faculty in this manner.

Q: Tell us about some of the current research that people might benefit from in the future.

Brown: Faculty and scientists with the Office of Biorenewables Programs are looking at ways to recycle nutrients between biorefineries and bioenergy plantations, grow medicines in corn kernels, ferment sugars into commodity chemicals, use natural fibers to produce building materials, breed soybeans into better biofuels, and replace natural gas in ethanol plants. I am working on a project that heats wood or cornstalks until they turn into a gas that is fermented by bacteria into a biopolymer that is currently produced from sugar. Our process not only allows a wider range of biomass to be employed in the production of biobased products, but allows it to be done less expensively.

Q: Is there demand to use this research in practical applications?

Brown: The recent growth of the grain ethanol industry has fueled interest in more advanced biobased technologies because of their ability to meet future demand for renewable fuels and green products. The United States has an ambitious goal of providing up to 30 percent of its transportation needs from biofuels. We get inquiries from companies and venture capitalists almost every week about new developments in this field.

Q: President Geoffroy announced the Bioeconomy Initiative in 2002 as a collaborative effort involving researchers throughout the university. How has this initiative grown and developed since then?

"The university has put in place a structure of institutes and R&D centers that positions it well as the leader in driving the science and technology of the bioeconomy forward."

Study conducted for the Iowa Department of Economic Development by the Battelle Memorial Institute, March 2004

Brown: The Bioeconomy Initiative is now being coordinated through our Office of Biorenewables Programs, and it has truly become a university-wide effort. Today, we have more than 50 faculty members and researchers representing 15 different academic departments from four of our colleges. We have erased the boundaries that often exist at a university to form a collaborative effort among the diverse talents on campus.

Q: On a personal level, what has motivated you to take a leadership role in this area? Why do you care so much?

Brown: Early in my academic career my research focused on fossil fuel combustion. My interest in biorenewables began about 12 years ago when I audited a course in atmospheric physics, just for fun. One of the subjects was global climate change. After one of these lectures I told students in one of my own courses on combustion that if carbon dioxide was ever declared a pollutant, I was getting out of the combustion business. I didn't see that we had too many alternatives to fossil fuels, especially for transportation. However, a colleague encouraged me to apply my knowledge of thermochemical processing of fossil fuels to biomass gasification. I soon began to appreciate the advantages biomass offered for reducing dependence on imported petroleum, mitigating greenhouse gas emissions, and revitalizing rural economies. Not too many people were working in this field at the time, so it was not difficult to be recognized as the "guy pushing biomass." I keep pushing because I sense that we are on the verge of a transforming event in the history of agriculture and energy utilization.



THE STUDENT EXPERIENCE

# A Student's Journey

## from the classroom to around the world.

Nathan Johnson // Graduate Student // Estherville, IA

What did you do for your summer vacation? For some students, the answer may be fun in the sun. Or a part-time job. Or both.

But for Nathan G. Johnson, summer is also a time to make a difference.

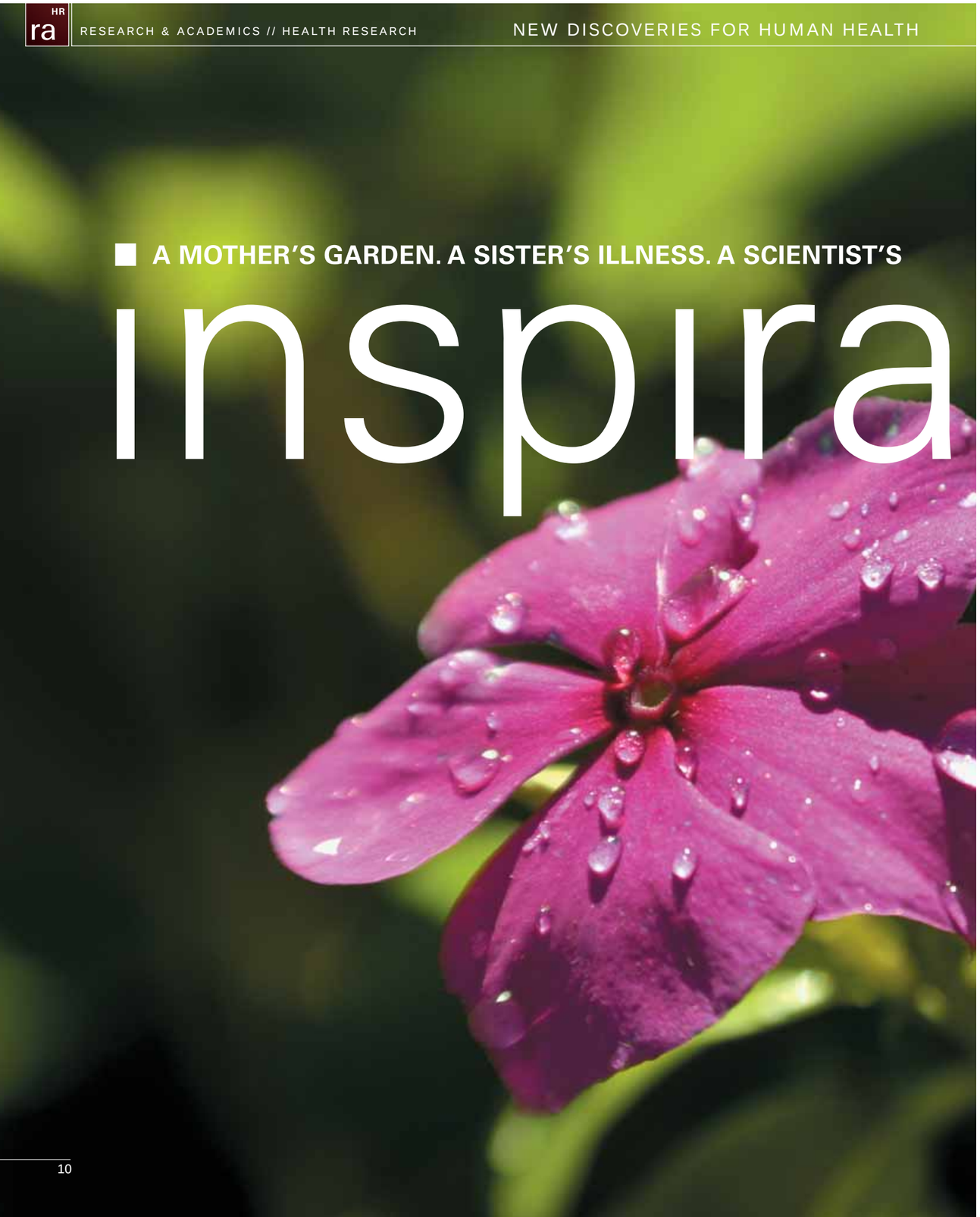
This native of Estherville, Iowa, used a National Science Foundation grant to work in rural Chinese villages, taking one part of the bioeconomy to the grassroots level by helping isolated, rural villages develop simple sources of energy for household use.

"I am researching how to make biorenewable energy viable and sustainable for rural communities," said Nathan. "Adding even one light bulb can dramatically change the quality of life in these villages."

Nathan's work in a half-dozen villages of the Shandong province of China is geared toward investigating the best way to create successful and sustainable sources of energy. His research is looking at how a number of factors make a difference, such as available technology, financial assets, human resources, and social institutions. Many of these villages have no energy sources today, and Nathan hopes his work will mean a change.

A doctoral student in mechanical engineering, Nathan is also completing a master's degree in interdisciplinary studies, including sociology, economics and anthropology. His education in hard science and cultural science are a good mix for Nathan's work. By applying cultural sensitivities with his knowledge of engineering, he hopes to make progress in areas that have been difficult in the past.

"This cross-disciplinary analysis is essential to further development studies, both theoretical and applied," adds Nathan. "All too often outside actors and policies attempt to assist the rural poor without a full understanding of local interests or capabilities. I hope to bring greater clarity to community biogas development initiatives, leading to more successful and sustainable small energy systems."



## A MOTHER'S GARDEN. A SISTER'S ILLNESS. A SCIENTIST'S

# inspiration.

THE DRIVE TO RESEARCH OFTEN COMES FROM VERY PERSONAL EXPERIENCES. FOR JACKIE SHANKS, A PROFESSOR OF CHEMICAL AND BIOLOGICAL ENGINEERING AT IOWA STATE UNIVERSITY, SUCH IS THE CASE.

Dr. Shanks grew up with a mother who loved gardening, as evidenced by a beautiful three-acre horticultural plot in Granger, Iowa. When her sister was diagnosed with non-Hodgkins lymphoma, she was inspired to learn more about chemotherapy. One of the drugs in her sister's treatment was derived from the leaves of a plant that grew in her mother's garden.

The periwinkle is a flowering plant with a whimsical name but a serious past. Also known as myrtle, the plant originated in Madagascar but has spread throughout the world, including the United States. It produces a pale pink or white flower used by many cultures for its pharmaceutical value. In Europe, it was a folk remedy for diabetes; in Hawaii, a poultice to stop bleeding; in China, a cough remedy.

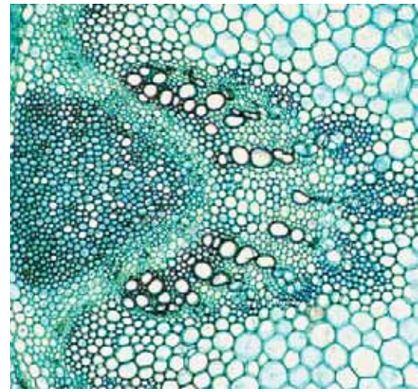
At Iowa State University, Dr. Shanks is researching how this pretty little flower can produce more chemotherapy drugs. She also is leading the way to create an interdisciplinary approach between chemical engineering and plant science.

"Given the exquisite chemistries in plants, and the numerous commercial applications, it is natural for chemical engineers to be involved in exploiting these chemistries," Dr. Shanks wrote in an article in the *AIChE Journal*.

This groundbreaking approach even required a new vocabulary to describe reactions caused by plant enzymes that result in useful products and what engineers can do to improve those reactions. Professor Shanks coined a new word – phytocatalysis – to describe the endeavor.

For Dr. Shanks, Iowa State University has many advantages for pursuing this type of research: "This university not only has a strong reputation in plant sciences and chemistry, but has developed the technology and research facilities needed to move scientific research forward. It enables faculty and researchers here to turn theories into applications that can make a difference in people's lives."

Dr. Shanks' research may lead to more effective production of a number of cancer-fighting drugs, or may provide the basis of discovery for other biopharmaceutical breakthroughs. In any event, it is changing how the scientific community looks at a flower found in gardens around the world. And by the way, Jackie's sister is living a healthy life as a school teacher in Des Moines, Iowa.



## Fighting Cancer:

### Finding a link between nutrition and prevention.

Ruth MacDonald is a keen student of what mice eat. More precisely, she is conducting tests with mice to study the relationship between cancer and diets that contain isoflavones, products found in soybeans that mimic the action of estrogen. Dr. MacDonald, chair of the Department of Food Science and Human Nutrition, and her colleagues provide hope that diet can make a difference in preventing cancer. For example, her research found a delayed onset of mammary tumors in mice fed diets containing soy isoflavones. Tests conducted on colon and prostate tumors in mice also found reductions in their size or number, providing hope that the inclusion of isoflavones and soy proteins in the diet may reduce the occurrence of some types of cancer.

This is just part of the research that uses the food science expertise in the College of Human Sciences to find an answer to the question: Is cancer preventable? For Diane Birt, the answer is loud and clear: Yes!

Dr. Birt, a Mary B. Welch Distinguished Professor in the College of Human Sciences and director of the Center for Research on Botanical Supplements, has advanced the understanding of the relationship between diet and cancer prevention, and what impact factors such as overeating, obesity and even food portions might have on the disease. Her research has ranged from looking at how plant flavonoids and genetically modified alfalfa can inhibit colon cancer to how resveratrol (a component of red wine) can be utilized as a cancer preventative to how control of adrenaline can reduce cancer-producing substances in the body.

" THE EXCITING THING ABOUT THE UNIVERSITY IS NOT ONLY THE COMMITMENT TO NEW DISCOVERIES, IT IS THE COMMITMENT TO TAKE NEW KNOWLEDGE AND PUT IT TO USE."

**DR. MAX ROTHSCHILD**
DIRECTOR, CENTER FOR INTEGRATED ANIMAL GENOMICS

# Pigs and People.
# A Healthy Relationship.

Max Rothschild may have been a genetic prodigy. As a boy, he was fascinated by the guinea pigs his father gave to him. It wasn't how they ran on a spinning wheel or climbed through tubes that caught his attention, but how the fur color of baby guinea pigs changed depending upon their parents.

An early lesson in breeding guinea pigs has led to mapping the complete genetic makeup of pigs.

Max Rothschild is now a Charles F. Curtiss Distinguished Professor in Agriculture and director of the Center for Integrated Animal Genomics, leading the research effort at Iowa State University to sequence the pig genome.

"The sequencing of the pig genome is a scientific advance that will offer great benefits for consumers and human health," says Dr. Rothschild.

Why human health? For starters, pigs and humans have something in common: a genome structure similar in size, complexity and organization, as well as extremely similar physiology. A full understanding of the pig genome will lead to future biomedical advances for humans. This may one day mean improved treatments for obesity, diabetes, and diseases affecting the heart, eyesight, and the reproductive system.

Complete knowledge of the swine genome also will lead to breeding pigs capable of producing human transplant organs, such as hearts and lungs. Pigs with a special genetic makeup could develop organs that are acceptable to the human body. Genetic coding within such animals could turn off the human body's natural tendency to reject an organ, and become a lifesaver for people in need.

And, genome research will mean benefits for consumers, not only reducing the cost of pork production but providing people with healthier meat that is lower in fat and higher in vitamins.

Iowa State University is the place for such research, according to Dr. Rothschild.

"Animal genetics is a relatively new science, and Iowa State is its birthplace," he says. "The exciting thing about the university is not only the commitment to new discoveries, it is the commitment to take new knowledge and put it to use."

Dr. Rothschild should know. Today, four out of ten pigs bred in the United States reflect the results of scientists' genetic research. In a matter of time, more humans will realize the benefits of this work.

Pigs and humans have something in common: a genome structure similar in size, complexity and organization, as well as extremely similar physiology.

"One day, this research will help alleviate vaccine shortages by producing safer, less costly medications, and at the same time enable us to develop more resilient crops to help end world hunger."

**DR. KAN WANG**
PROFESSOR OF AGRONOMY

"THIS IS A UNIVERSITY WITH A GREAT VISION AND A GREAT CONSCIENCE THAT IS UNAFRAID OF CHALLENGE OR CONTROVERSY WHEN IT COMES TO EXCELLENCE IN SCIENTIFIC RESEARCH."

FROM MAO'S CHINA TO IOWA'S LABS...

# An Adventure in Learning and Research.

"Learning how nature works and mimicking it to improve our lives is lots of fun," says Kan Wang.

Today, Dr. Wang is having "fun" as a leading expert in the area of plant transformation and biopharmaceutical development. A professor of agronomy and director of the Center for Plant Transformation in the Plant Sciences Institute, she is recognized around the world as an authority on plant genetics.

Dr. Wang is optimistic about what her work will mean in the future: "One day, this research will help alleviate vaccine shortages by producing safer, less costly medications, and at the same time enable us to develop more resilient crops to help end world hunger."

Three decades ago, her future was less certain. Growing up in Mao's Communist China during the Cultural Revolution of the late 1960s and early 1970s, her life in Shanghai was a long way from research labs and major universities.

Dr. Wang was raised by her grandparents, who were harassed and ostracized by Mao's Red Guard because of their political views. Further complicating her early years was the fact that China's educational system was all but shut down. Rather than science and math, students recited Mao's writings. But a young Wang and her friends managed to learn on their own by secretly sharing math, physics and English textbooks.

With the end of the Cultural Revolution, Dr. Wang was able to enter college, where she was a top student in biology, and then went on to the University of Ghent in Belgium, becoming a leading researcher in molecular biology and plant genetics. She moved to Iowa in 1989, working in crop genetic engineering at ICI Seeds, and six years later joined the faculty at Iowa State University.

Her research at Iowa State has played an important role in the development of biopharmaceutical corn, which produces a therapeutic protein that can be used for vaccinations. She also is helping develop a variety of biopharmaceutical corn that does not shed its pollen. Such a development is important because it allows biopharmaceutical corn to be more widely grown without its pollen coming in contact with corn that is grown for food and feed.

Dr. Wang's genetic work is also leading to more stress-tolerant crops, such as a variety of corn that uses a tobacco gene to increase its resistance to cold weather. This discovery could result in new varieties of corn that will survive early or late season frosts.

Her lab has even developed genetic transformation tools that enable plant scientists to study plant gene functions more effectively.

Despite her expertise and hard work, Dr. Wang credits the environment at Iowa State University with making many of her discoveries possible.

"This is a university with a great vision and a great conscience that is unafraid of challenge or controversy when it comes to excellence in scientific research," says Dr. Wang. "I may have quit 300 times over, but Iowa State University was always right beside me to help and support expanding our knowledge."


## A new oil may mean healthier foods.

For most people, January 1, 2006, was another New Year's Day. But Walter Fehr – a Charles F. Curtiss Distinguished Professor in Agriculture – had other reasons to celebrate. That was also the day the U.S. Food and Drug Administration began requiring food companies to list the amount of trans fat on nutrition labels.

For Dr. Fehr, it meant a new soybean oil he developed could provide food manufacturers with a healthy alternative. Because his new oil did not require hydrogenation, it did not contain the trans fat found in most food oils. Trans fat has been linked to higher cholesterol and increased risk of heart disease.

The new oil is the result of nearly 35 years of work by Dr. Fehr in the development of new soybean varieties as well as new uses for the plant.

Food makers are currently conducting tests on how the new oil works in products that require stable oils – products such as cereals, energy bars and sauces. Dr. Fehr is optimistic the results will be positive, giving consumers a healthier oil in many of the foods they buy and soybean farmers another new market for their crop.

"Mapping the genome is something like reading an owner's manual. Until we've read the manual, we can't imagine all the possible functions that exist."

**DR. PATRICK SCHNABLE**
DIRECTOR, CENTER FOR PLANT GENOMICS

# computers and corn:

## TAKING ON THE MOST COMPLEX GENOME PROJECT EVER.

A human has around 26,000 genes. Corn may have twice that number. Scientists at the Plant Sciences Institute are deciphering the genetic structure of corn, the most complex genome mapping project ever undertaken.

One challenge in such an effort is how to assemble and track tens of millions of pieces of genetic data and material. The solution? Put one of the world's fastest supercomputers to work.

Iowa State University's new CyBlue supercomputer is capable of performing 5.7 trillion calculations per second and storing up to 11 trillion bytes of data. One of the fastest supercomputers in the world, CyBlue allows genetic researchers to process in a matter of days data that otherwise would have taken months to complete.

"CyBlue is an extraordinarily valuable resource," says Dr. Patrick Schnable, professor of agronomy and director of the Center for Plant Genomics. "The use of CyBlue enables us to get information quicker to plant breeders, make faster progress in modifying corn plants, and make the latest data available to scientists around the world. Without exaggeration, access to this computer allows us to do experiments that few other plant scientists can even attempt."

Why go to this effort? Because, a better understanding of corn, one of the world's major crops, will lead to improvements in areas ranging from meeting the world's food needs to developing new alternative uses.

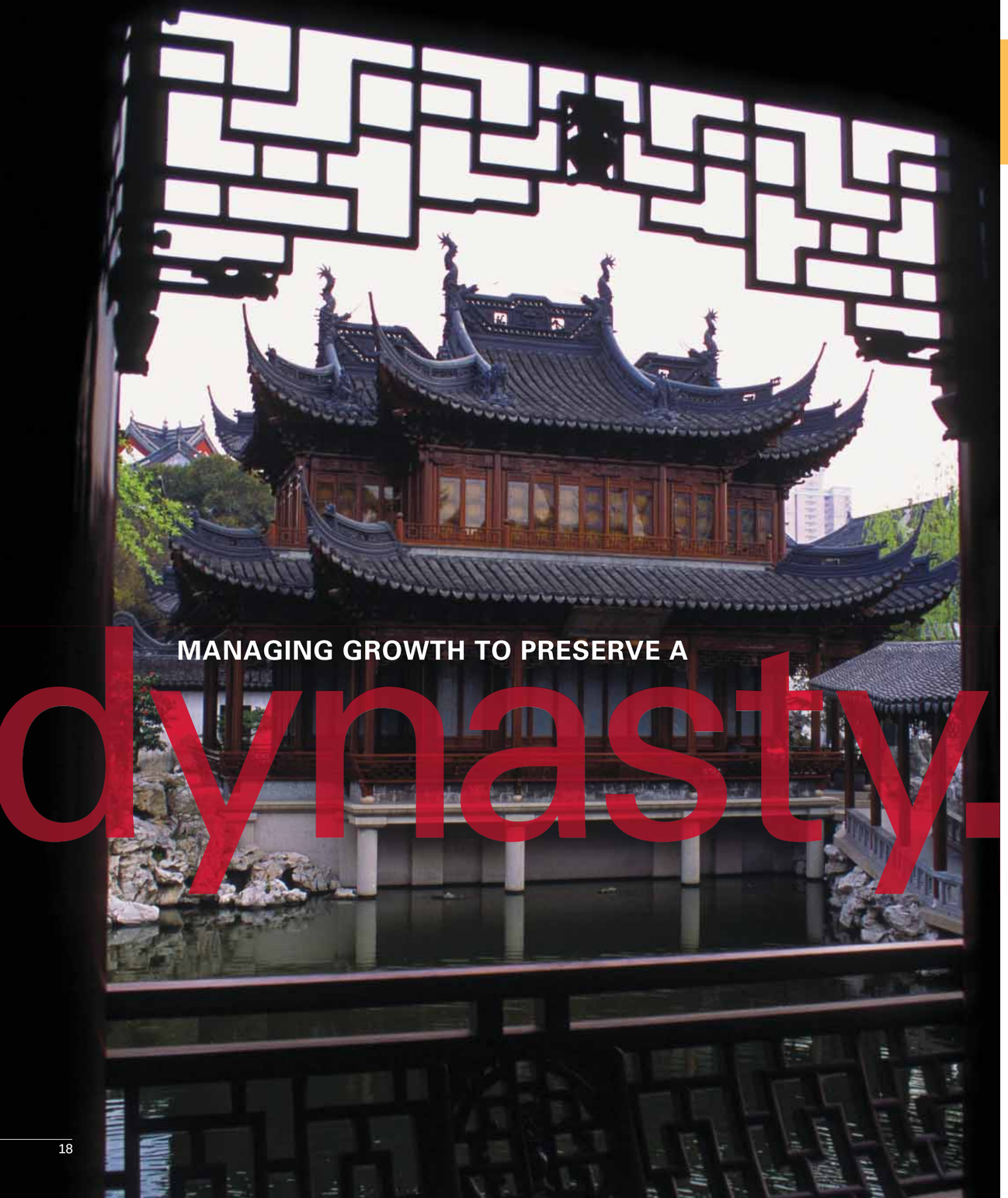
"Given the interconnectedness of life, studying the corn genome actually tells us more about ourselves," says Dr. Schnable. "Many genes and processes are shared by corn and humans. By studying the similarities and differences between the genomes of these two species, we'll better understand how both work."

One benefit from understanding corn's genetic blueprint will be to help develop corn that serves specific purposes, such as energy. For example, a corn variety with a higher level of fermentable sugars would be an improved ingredient in the production of renewable fuels.

"Mapping the genome is something like reading an owner's manual. Until we've read the manual, we can't imagine all the possible functions that exist," added Dr. Schnable. "After the genome has been mapped we'll be able to associate specific genes with important traits."

### ISU'S CYBLUE: one of the fastest

- IBM Blue Gene/L supercomputer, located in the Durham Center, contains 2,048 processors
- Capable of 5.7 trillion calculations per second
- Stores up to 11 trillion bytes of data
- Among the world's 100 fastest supercomputers, according to the June 2006 TOP500 list released at the International Supercomputer Conference
- Cost: $1.25 million
- The world's first electronic digital computer was designed and built at Iowa State University by Professor John Atanasoff and graduate student Clifford Berry in the late 1930s and early 1940s.



# MANAGING GROWTH TO PRESERVE A dynasty.

**WHEN THE NATIONAL SCIENCE FOUNDATION SOUGHT ARCHITECTURE EXPERTS TO BALANCE FOURTEENTH CENTURY HISTORY WITH TWENTY-FIRST CENTURY GROWTH, A TEAM OF IOWA STATE RESEARCHERS AND THE UNIVERSITY'S VIRTUAL REALITY APPLICATIONS CENTER ANSWERED THE CALL.**

The mission for Chiu-Shui Chan, professor of architecture, and a team of students, was to help the city of Beijing, China, manage rapid urban growth while protecting ancient cultural and historic sites dating back to the Ming Dynasty. The focus of their work was an inner city area of Beijing that includes the home and temples used by ancient emperors as well as the modern Xidan Business District.

"The whole idea was to reconstruct history through a digital model to visualize the culture and the history. The other idea was to see how the modern commercial beauty of the city might conflict with the historic form," Dr. Chan says.

The effort required an interdisciplinary approach, combining the skills of architecture, appreciation for art and design, and computer science. Working with government officials in Beijing, Dr. Chan and his team of Iowa State students spent two weeks in China taking measurements in the historic neighborhood. The team then returned to Ames, entered its data and built models of the ancient Temple of Heaven, the central business district, and a courtyard of an upscale house once occupied by a powerful Chinese general.

The models were made from three-dimensional images projected in the Virtual Reality Application Center's C6, the nation's first six-sided virtual reality room.

"Through the digital models we could see and comprehend the culture, the history, and the urban fabric and, of course, we wanted to see the full-scale," he says.

The Iowa State team then applied potential building and zoning code regulations to examine what impact they could have on the appearance of the neighborhood. As a result of the study, planners in Beijing are beginning to implement zoning and building code regulations to accommodate the burgeoning city's growth without jeopardizing the historical sites.

A native of Canton on China's southeast coast, Dr. Chan's work on the project also has helped to build up academic exchanges among several Chinese universities. As a result, he had invited four deans and top faculty members from five leading colleges of architecture to visit Iowa State for teaching and research cooperation, and invited Iowa State faculty to teach in Chinese universities. More cooperation will continue in the future.

"Through the digital models we could see and comprehend the culture, the history and the urban fabric and of course, we wanted to see the full-scale. That's why we worked with the Virtual Reality Application Center."

**DR. CHIU-SHUI CHAN**
PROFESSOR OF ARCHITECTURE

## Virtual Reality Application Center:
### the most real virtual reality in the world.

Home to C6, the nation's first six-sided virtual reality room:

- $4 million upgrade makes it most realistic in the world
- 100 million pixels will shine in the facility, twice the number of any other simulator
- Operated with 96 graphic processing units, 24 digital projectors, an "eight channel" audio system, and ultrasonic "motion tracking" technology

THE STUDENT EXPERIENCE

"MY PERSONAL GOAL IS TO CONTINUE TO DEVELOP INNOVATIVE TOOLS, AND TO WORK TO KEEP TECHNOLOGY FROM BEING OVERWHELMING FOR THE USER. THINGS THAT WE PRODUCE SHOULD BE EASY TO USE AND MAKE PEOPLE FEEL EMPOWERED RATHER THAN INTIMIDATED."

Melinda Cerney Knight // '05 PhD // Omaha, NE

# who needs a mouse?

What does a simple move of your right elbow have to do with your personal computer? Eventually, it could mean a great deal. Melinda Cerney Knight's fascination with human movement led her to look into ways for people to communicate with their computers through gestures.

As Iowa State University's first PhD candidate in human computer interaction, she turned to the Virtual Reality Applications Center to capture and visualize hundreds of different movements of the human body. Her goal was to create software that would interpret and respond to specific movements. For example, if a user raised his or her hand as though asking a question, the computer would recognize the posture and position of the arm and respond by providing assistance or a help menu.

After receiving her PhD in May 2005, she put her HCI experience to work for the Microsoft User Experience Team that is developing Windows Vista, the software giant's newest computer operating system.

Dr. Cerney Knight continues to observe human gestures, only this time the subjects are real and they control their computers with a mouse and keyboard instead of full-body tracking gear. She watches them work with Vista so she can gauge their reactions to features ranging from colors, to error boxes or the process of searching for files.

"My personal goal is to continue to develop innovative tools, and to work to keep technology from being overwhelming for the user. Things that we produce should be easy to use and make people feel empowered rather than intimidated," she says.

Her gesture recognition study at Iowa State, for example, could eventually lead to improved voice recognition systems and new applications that make computers more accessible to the disabled.

"Anything that we can think up can probably be created," says Dr. Cerney Knight.



# staying a step ahead of hackers.

DOUG JACOBSON IS SETTING OUT TO BUILD A NEW INTERNET, NOT TO COMPETE WITH THE WORLD WIDE WEB, BUT TO MAKE IT SAFER.

Dr. Jacobson, director of the university's Information Assurance Center, is leading a new research project, the Internet-Scale Event and Attack Generation Environment, aimed at thwarting new generations of computer hackers, thieves and sexual predators.

A virtual internet will have branches throughout the university. Hackers will use the virtual Web to try to sabotage real computers and computer networks. Faculty and students will try to match wits with the hackers by creating firewalls and other computer and user protection technologies.

The success of computer and network security systems in recent years has forced hackers to change their strategy, Dr. Jacobson says. The research focuses on how to combat new schemes that are directed toward individuals rather than computer networks.

"The attackers are more and more going after the weak link, which is people," Dr. Jacobson says. "As far as computer security technologies are concerned, an e-mail message that tells the user to go to a Web site and type in a Social Security number doesn't look much different from an e-mail that came from grandma."

An associate professor of electrical and computer engineering, he was a recent target of a brazen attack. An e-mail message purportedly from Yale University claiming an article was about to be written about him was in fact a "Trojan horse" – a computer virus.

Creating technologies that can recognize risky e-mails and better track the source of predatory or virus-laden e-mails and Web sites will be a focus of Internet-Scale Event and Attack Generation Environment studies, which are funded by the U.S. Department of Justice. The big challenge, says Dr. Jacobson, will be balancing security and privacy.

"Technologies that assist the user in security unfortunately run up against the privacy issue, so there's a real delicate balance that has to get played out between security and privacy," he says.

# TAKING ON NATURE'S FURY.

DR. SARKAR BELIEVES THE WORK IN THE LABORATORY WILL HELP IDENTIFY METHODS TO STREAMLINE THE BUILDINGS AND ENHANCE THEIR STRENGTHS, AND ULTIMATELY TRIGGER BUILDING CODE IMPROVEMENTS WITHIN THE NEXT FIVE TO TEN YEARS.

## IF BUILDINGS ALONG THE FLORIDA COAST CAN BE BUILT TO WITHSTAND 150-MILE-PER-HOUR HURRICANE WINDS, WHY SHOULDN'T BUILDINGS IN THE MIDWEST BE CAPABLE OF WITHSTANDING THE 150-MILE-PER-HOUR WINDS OF AN F2 TORNADO?

Partha Sarkar, a professor of aerospace engineering and director of Iowa State's Wind Simulation and Testing Laboratory, believes the work he and his colleagues, Bill Gallus and Fred Haan, have started will result in stronger buildings, ultimately saving lives and eliminating up to $1 billion in tornado damage each year.

Resembling a grain bin attached to a crane, Iowa State University's tornado simulator can mimic nature to create and move a tornado vortex up to eight feet tall and four feet in diameter and generate wind speeds on a 1:5 velocity scale, equivalent to a category F5 tornado that packs winds up to 315 miles per hour. By placing models of structures inside the simulator, researchers can determine how their shapes influence the wind loads.

Dr. Sarkar, a native of India and son of an engineer father, has always been intrigued by civil engineering structures and the materials that are used to build them. His fascination with the effects of wind took root when as a graduate student at Washington State University and Johns Hopkins University, he studied the principles that led to the 1940 collapse of the Tacoma Narrows Bridge. Nicknamed Galloping Gertie because even the slightest wind would cause it to rock vertically, the 5,979-foot-span bridge was ripped apart in 40-mile-per-hour winds less than four months after it was completed and opened to traffic.

Several years later, Dr. Sarkar traveled to Tennessee to see firsthand the effects of an F4 twister that struck downtown and suburbs of Nashville, and vowed to study ways to prevent tornado devastation.

"Most of my colleagues felt that a tornado was something you couldn't do anything about because the forces are very large," he says. "I told myself something needs to be done about it, and the first step is to understand how the tornado interacts with a structure."

It wasn't long before Dr. Sarkar accepted a faculty position in engineering mechanics in the Department of Aerospace Engineering at Iowa State University where he met Dr. Gallus, a professor of geological and atmospheric sciences. They collaborated to design a tornado simulator, found laboratory space in Howe Hall for the Wind Simulation and Testing Laboratory, and used a local metal manufacturer in Ames who could supply the parts and an Ohio-based company that supplied the fan and motor that is a vital component of the simulator. Dr. Sarkar then put together a team of undergraduate aerospace engineering students and a technician to assemble the simulator.

The simulator is designed to determine the tornado wind loads on buildings and various other structures that are of different shapes and sizes. Dr. Sarkar believes the work in the laboratory will help identify methods to streamline the buildings and enhance their strengths, and ultimately trigger building code improvements within the next five to ten years.

"Right now, the buildings aren't designed for withstanding any tornado. Even the most commonly occurring tornadoes of lower intensities can damage them," Dr. Sarkar says. "I'm saying, let's design them for 120- to 150-mile-per-hour tornado-type winds. If we do that, we'll save ourselves from a lot of economic losses as a nation."

# The Next Generation of leadership.

THE STUDENT EXPERIENCE

Michelle Marie Bobo // Senior, Graphic Design // Des Moines, IA

When Michelle Bobo graduated from Roosevelt High School in Des Moines, she wanted to leave Iowa and try someplace new. But, after attending a college in Chicago, she decided that the best place for a great education, and a place that would give her a chance to make a difference, was closer to home.

"Iowa State has many opportunities that encourage students to take on leadership roles," said Michelle, the 2006 recipient of the Sandra and Lynn Davis Leadership Award. "The atmosphere at Iowa State is very optimistic and inviting. Being able to get involved helped me to explore my interests as well as become better prepared for what I want to do in life."

Michelle has been a leader in areas of both professional and personal interest. When she first arrived at Iowa State, she spearheaded philanthropy work in the Ames community on behalf of her sorority. A graphic design major, Michelle has been an officer with the student chapter of the American Institute of Graphic Arts and a mentor to other design students.

Her leadership abilities and design talent has enabled Michelle to make a difference for Iowa State's diverse student body population. She has been active in both the Multi-Ethnic Club and the Black Student Alliance. Michelle has also volunteered her design skills with the Margaret Sloss Women's Center, an on-campus program that promotes acceptance and understanding among people of all races, genders and sexual orientations, as well as for *Uhuru*, an on-campus magazine that addresses issues important to the African American, Latino, Asian and Native American communities.

"At Iowa State, I had many chances to become involved, and had the encouragement to do so, and it has made a difference in preparing me for future success," added Michelle. "My opportunities have flourished here, and I know I have picked the right school."



The Undergraduate Experience.

# Educational Adventures. Personal Breakthroughs.

At Iowa State University, breakthroughs not only happen in the laboratory. They happen with our students, as well. The unique undergraduate experience at Iowa State University allows students the chance to break through and discover their own interests, strengths and passions.

The undergraduate experience at Iowa State is student-centered and student-active, providing flexibility to pursue not only a higher education, but also countless participation opportunities to prepare for success in life. With more than 100 majors, 600 student clubs, 1,700 faculty members, and a one-of-a-kind campus, Iowa State University offers an adventure in education and an opportunity for breakthroughs ... 25,000 students at a time.

## OPEN OPTION. MAXIMUM FLEXIBILITY.

Many students are not ready to immediately declare a major. Iowa State's Open Option program gives undergraduates the chance to become familiar with different academic opportunities and determine the best match for their interests and abilities. Administered by the College of Liberal Arts and Sciences, students are assigned an academic adviser to select courses that provide a sampling of interests while at the same time meeting requirements for graduation. Open option students can also join learning communities with students who share similar interests, attend special orientation sessions, and take career development classes to consider majors and careers that match their interests, abilities and goals. With the support available to open option students, they are just as likely to graduate in four years as students who begin with a declared major.

## A DECADE OF TOP-NOTCH LEARNING COMMUNITIES.

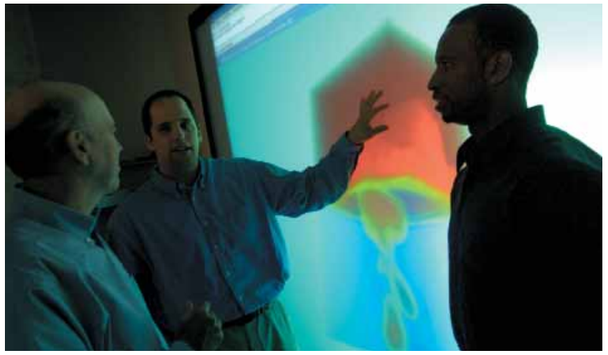
For the past ten years, Iowa State has been a leader in developing smaller learning communities within a major university. In fact, for several years *U.S.News & World Report* has recognized Iowa State for outstanding academic programs that contribute to student success. Iowa State was one of 25 public colleges or universities in the nation recognized for "first-year experiences" and one of 10 public universities recognized by the magazine for "internships/co-ops" opportunities for students. Under the direction of Corly Brooke and Doug Gruenewald, Iowa State's Learning Community program epitomizes the student-focus support that provides a great undergraduate education.

IOWA STATE WAS ONE OF 25 PUBLIC COLLEGES OR UNIVERSITIES IN THE NATION RECOGNIZED BY *U.S.NEWS & WORLD REPORT* FOR "FIRST-YEAR-EXPERIENCES" AND ONE OF 10 PUBLIC UNIVERSITIES RECOGNIZED FOR "INTERNSHIPS/CO-OPS" OPPORTUNITIES FOR STUDENTS.

## a lead-free Europe.

An invention by the U.S. Department of Energy's Ames Laboratory, operated by Iowa State University, is helping Europe implement new restrictions on the use of lead. A new solder made from a tin-silver-copper alloy is helping manufacturers meet the European Union's restrictions recently enacted on the use of lead and other hazardous materials in consumer electronics and home appliances. The solder has a lower melting point and greater strength than other lead-free alternatives. Dr. Iver Anderson, inventor of the solder, was named the 2006 Iowa Inventor of the Year.

## software speeds up problem-solving for engineers.



Engineers will be able to solve problems more quickly, thanks to software developed by researchers at Iowa State University. The software created by Mark Bryden, associate professor of mechanical engineering, researcher Gerrick Bivins and doctoral candidate Doug McCorkle is capable of taking large amounts of 3-D data sets and quickly turning them into pictures that engineers can study and analyze. Their work was supported by nearly $1.3 million in funding from the U.S. Department of Energy's Ames Laboratory and was recognized with *R&D* magazine's 2006 R&D 100 Award, the 29th such award won by researchers at Iowa State University.

## helping Iowa communities realize their vision.

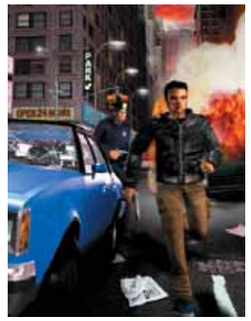
More than 160 projects have enhanced smaller communities across the state. Iowa's Living Roadways Community Visioning Program, administered by the Department of Landscape Architecture, puts students, faculty and alumni to work helping local officials and volunteers improve their community landscape. The help is available to cities with fewer than 10,000 residents. Projects can include such things as plans for new parks, improving the gateway into town, creating new lighting and signage, and maximizing natural scenery and landmarks. Projects are done in conjunction with Trees Forever, a nonprofit environmental group based in Marion, and funded by the Iowa Department of Transportation. The Community Visioning Program has been nationally recognized, winning the American Planning Association's 2006 Outstanding Planning Award for a Project, Program or Tool.

## entrepreneurship program among the best.

The Pappajohn Center for Entrepreneurship at Iowa State is among the top 25 undergraduate programs for future entrepreneurs, according to a survey of more than 700 colleges and universities by *The Princeton Review* and *Entrepreneur* magazine. Iowa State, which offers an entrepreneurship minor, provides students with many opportunities for hands-on, practical business experiences as well as a faculty that serves as mentors. "We always believed we had a great program," said Labh Hira, dean of the College of Business. "We're proud of the interdisciplinary nature of our entrepreneurship curriculum, and it's great to receive the external testimonial on it from *The Princeton Review* and *Entrepreneur*."

## the best in vet med education.

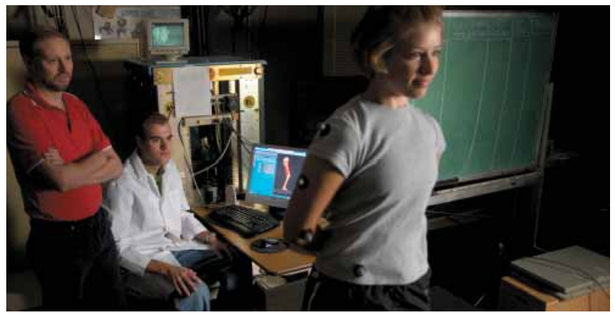
Iowa State's world-class College of Veterinary Medicine is exemplified by Dr. Holly Bender. Dr. Bender was the 2004 recipient of the National Carl J. Norden-Pfizer Distinguished Teacher Award recognizing the nation's top veterinary medicine educator. She was honored for her teaching of diagnostic problem-solving skills and the impact she has on her students.



## violent video games.

A pair of Iowa State University psychologists confirmed a fear of many parents: violent video games desensitize people to real-life violence. Craig Anderson and Nicholas Carnagey tested 257 college students, and found that playing a violent video game for as little as 20 minutes could cause people to be less aroused after viewing real-life violence. The researchers hope to expand their study to look at whether other forms of entertainment, such as television and movies, have a similar impact.

## understanding human performance.



Iowa State University's new health and human performance laboratories will mean improved research about the human body. The state-of-the-art labs use the latest research techniques in areas such as applied motor development, exercise biochemistry, exercise physiology, exercise psychology, health promotion and exercise, hemodynamics, molecular exercise physiology, motor control/learning, and pediatric exercise science. This research will stimulate new knowledge on physical activity and its relationship to health and well-being. Projects currently under way include studies on rehydration, steroid use and the emotional response to exercise.

# New and Improved Places, for New and Improved Breakthroughs.

Creating an environment for knowledge and discovery requires places that support the work and inspire the mind. For faculty and students. For researchers and administrators. For alumni and visitors. Public and private support has enabled Iowa State University to invest tens of millions of dollars each year to continually improve the campus, from building state-of-the-art facilities to renovating historic landmarks.

### Gerdin Business Building

Opened in 2004, the Gerdin Business Building is home to the College of Business, providing the tools of commerce to the halls of learning. The $25 million, 111,000-square-foot building features high-tech classrooms and laboratories that replicate real work environments for nearly 4,000 undergraduate and graduate students.

### Hoover Hall

Hoover Hall, together with Howe Hall, form the Engineering Teaching and Research Complex. Completed in 2004, the ETRC cost a total of $62.5 million and represents the largest capital project ever undertaken at Iowa State University.

### Lloyd Veterinary Teaching Hospital

Established in 1879, Iowa State's College of Veterinary Medicine is the oldest professional school of its kind in the nation and will soon have one of the newest teaching and research facilities. The $51 million Lloyd Veterinary Teaching Hospital renovation will expand the existing facility, improve diagnostic labs, and provide new large animal wards, intensive care units, and advanced imaging facilities.

### Roy J. Carver Co-Laboratory

The Carver Co-Laboratory plays a very important role in the academic mission of Iowa State University. Built in 2003 with support from the Roy J. Carver Charitable Trust, this $17.5 million, 53,200-square-foot facility is home to the Plant Sciences Institute and its leading laboratories for research in genomics, plant molecular biology and high-tech instrumentation development, and the university's new biosafe greenhouse.

### Hixson-Lied Student Success Center

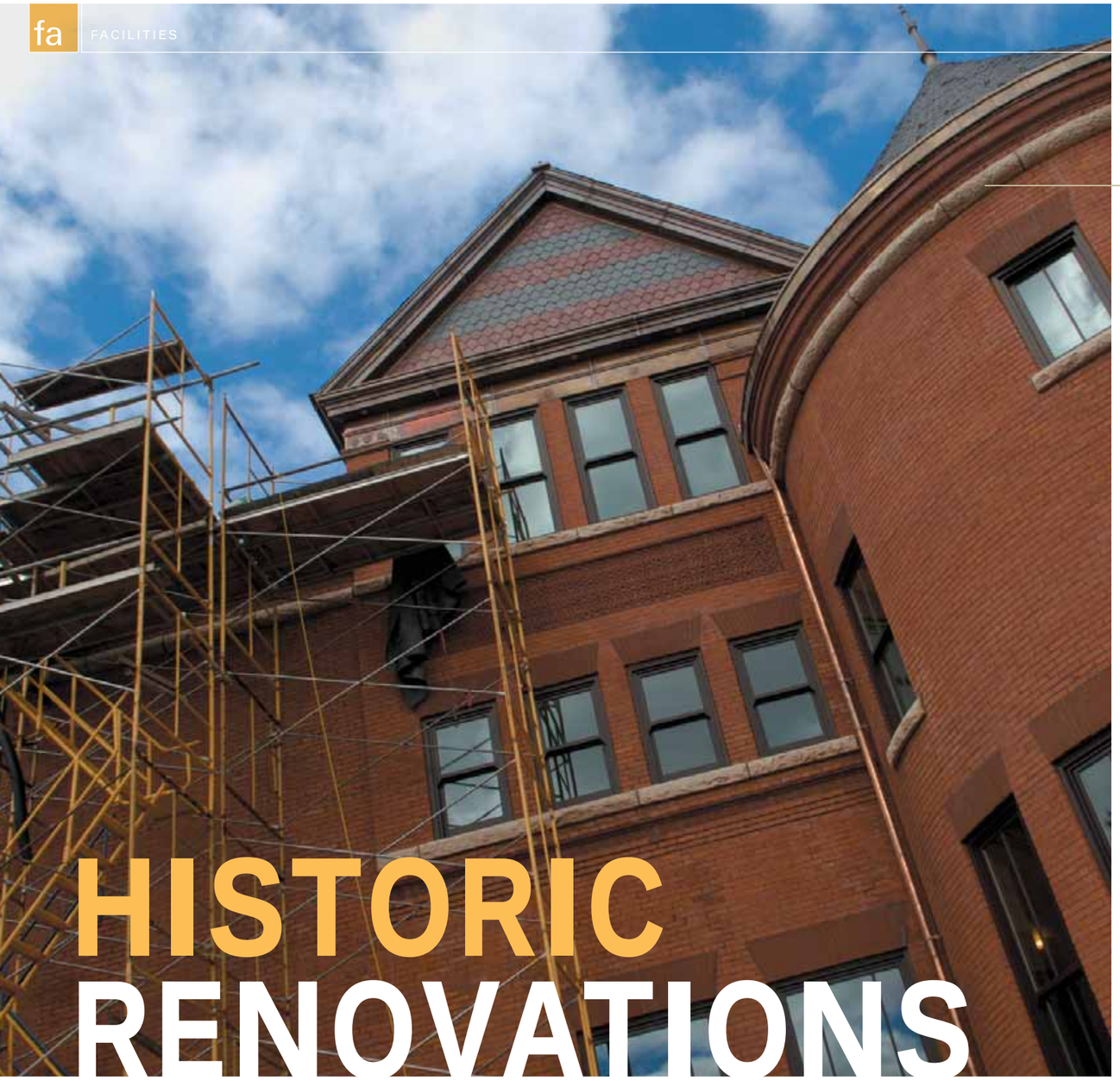
This $10 million academic learning center is all about Iowa State University's most important resource: students. Funded entirely with private support, the 33,500-square-foot center will house academic counseling, tutoring and testing services, as well as a centralized study facility and computer lab for student-athletes.

### Christina Reiman Butterfly Wing

Each year, more than 200,000 people visit Reiman Gardens. The new $10.3 million Conservatory and Christina Reiman Butterfly Wing has more than 50 species of butterflies and hundreds of exotic plants. Reiman Gardens has become the premier education, research and public gardens complex in the Midwest.

### Dairy/Animal Science Facility

The study of food has been an important part of the research conducted at Iowa State University, and the new Dairy/Animal Science Education and Discovery Facility builds upon that tradition for the 21st century. The $15 million, 887-acre facility will enhance research opportunities in areas such as nutrition, genetics and breeding, and health.

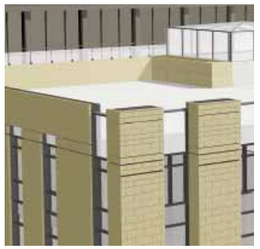


# HISTORIC RENOVATIONS

Iowa State University is also preserving and improving buildings that are important to our campus history and tradition. More than $14 million was recently spent to upgrade 75 percent of the classrooms throughout the campus, and such notable buildings as Morrill (1890), Beardshear (1906), and MacKay (1911) are all undergoing renovations to maintain them as vital parts of the campus for many years to come.



Built in 1890, **Morrill Hall** has served Iowa State in many important roles over the years. A $10.285 million renovation, paid in large part thanks to support from nearly 3,200 donors, means this building will serve as home to the new Christian Petersen Art Museum, the Center for Visual Learning in Textiles and Clothing, and the Center for Excellence in Learning and Teaching.




The Memorial Union is an icon on the Iowa State campus. A $20.8 million renovation will add a two-story, 25,000-square-foot addition for the University Book Store, new dining and retail space, improved entrances, and upgraded amenities throughout the building.

## Student Living Improvements

A study at Iowa State University found that living in a residence hall might help students graduate from college. The six-year study compared incoming students who lived on-campus with those who lived elsewhere. Students living on campus during their first year of college were 20 percent more likely to graduate, and a second year of living on campus raised the likelihood to 25 percent.

Iowa State University is committed to making the student experience as positive and productive as it can be, not only in academics but in daily life. Toward that goal, more than $123 million has been spent so far in the 21st century to improve residence halls and dining services on campus. Facilities that have been built or renovated are:

- **Buchanan Hall**
- **Eaton Hall**
- **Frederiksen Court apartments**
- **Maple Hall**
- **Martin Hall**
- **Union Drive Community Center**

## CYCLONE ATHLETICS

# taking the next big step.

**Jamie Pollard**
Director of Athletics
Iowa State University



Great universities push boundaries. They are places of great expectation, where breakthroughs reign over the status quo. For Jamie Pollard, athletics should be no different.

Pollard, who became director of athletics at Iowa State University on October 1, 2005, says it is time for the entire Cyclone community to get out of its comfort zone and have greater expectations.

"I've traveled the state and nation and heard about your dreams and goals for elevating the academic excellence and competitive accomplishments of our student-athletes," Pollard says. "We can 'take the next big step,' but it will require a united effort from everyone. The time to reach for the stars is now."

Pollard has wasted no time. Within six months of his appointment, Pollard hired a living legend, Cael Sanderson, to lead the wrestling program and appointed Greg McDermott as head men's basketball coach. A few weeks later, he unveiled a $135 million plan to renovate and upgrade multiple facilities, most notably Jack Trice Stadium and Hilton Coliseum.

Intensely competitive, Pollard says his goal is to create and communicate a vision for Iowa State athletics. Part of that vision involves better funding. Having the lowest budget in the Big 12 Conference hampers Iowa State's ability to compete, he says. While it is a symptom of the challenges ahead, he is confident Cyclone supporters will step forward and meet it head-on.

Before coming to Iowa State University, Pollard worked in athletics departments at St. Louis University, the University of Maryland and the University of Wisconsin, where he served as deputy athletics director under Barry Alvarez.

"A successful athletics department can be a catalyst for creating Iowa State pride," Pollard says. "When the Cyclones win and graduate their student-athletes, it increases the public's engagement with our university. It's pretty easy to see how important it is for athletics to 'take the next big step.'"

> "A successful athletics department can be a catalyst for creating Iowa State pride."

Lyndsey Medders

Academic All-Big 12, first team
Women's Basketball All-Big 12, first team

## Champions
## in the classroom.

ACADEMIC HONOREES:
Since 2001, more than 200 Cyclone student-athletes have received All-Big 12 honors for their academic achievements, and an additional 22 have received Academic All-America recognition.

GPAs:
For five years in a row, student-athletes have registered an overall grade point average higher than the undergraduate population of the university.

# VICTORY IN COMPETITION.

## BIG 12 CHAMPIONS:

The women's gymnastics team won the 2006 Big 12 Championship. And in 2005, the football team shared the Big 12's North Division title for the first time ever.

## POST-SEASON COMPETITION:

A number of Iowa State teams have participated in post-season play, several on multiple occasions, in recent years:

- The football team has led the way, earning bowl bids in five out of six years and winning the first bowl games (the 2000 Insight.com and 2005 Independence Bowls) in Iowa State history.
- The women's gymnastics squad qualified for the NCAA Championships two years running and in 2006 advanced to the "Super Six" for the first time in school history.
- The women's soccer team earned its first NCAA Tournament bid in school history and became the first Division I-A program in Iowa to qualify for the national championship.
- The women's basketball team has participated in either the NCAA Tournament or WNIT nine times in the last decade.
- The wrestling team placed second at the 2001-02 NCAA Championship and crowned three national champions.
- The men's basketball team counts an Elite Eight appearance in the NCAA Tournament among its five post-season trips in the last seven years.

## OLYMPIANS:

The 2004 Summer Olympics featured six Cyclones as competitors and coaches. Cael Sanderson reached the pinnacle of international success by winning a gold medal in wrestling. Kristen Karanzias played for Greece's softball team, while Erin Wood was a member of the U.S. squad. Bobby Douglas and Kevin Jackson were members of the wrestling coach staff, and Ileana Moschos was an assistant coach for the Greek soccer team.

## COACHES OF THE YEAR:

Two women's coaches – Rebecca Hornbacher (soccer) and K.J. Kindler (gymnastics) – were named 2006 Big 12 Coaches of the Year, while Dan McCarney (football) was the 2004 Big 12 Coach of the Year.

## COMPETITIVE FACTOIDS:

Former quarterback Seneca Wallace played in Super Bowl XL for the Seattle Seahawks in 2006 … Cael Sanderson's undefeated (159-0) four-year wrestling career was named one of the "25 Defining Moments of the NCAA" in 2006 … freshman Kiel Uhl won the 2006 USA Junior National Cross Country championships and represented the United States at the World Championships … David Rotich broke the four-minute barrier in the mile, with a clocking of 3:59.5 on Iowa State's Lied Recreation/Athletic Center track.

# new leaders join our team.

Cyclone sports have welcomed several exciting new leaders to the team of coaches and administrators in recent years. New faces in key positions include:

**Greg McDermott**
Men's basketball coach
He left his alma mater, the University of Northern Iowa, where he led the Panthers to appearances in three NCAA basketball tournaments, to direct the Cyclone program.

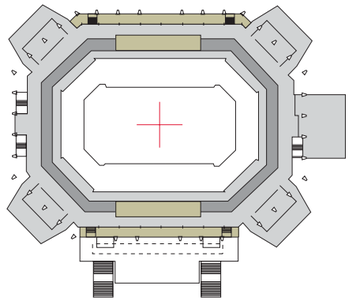
**Stacy Gemeinhardt**
Softball coach
She got the club off to a strong start in her first year with the Cyclones by winning 23 games, the most since 1999.

**Christy Johnson**
Volleyball coach
In her first season at Iowa State, Johnson's team won more Big 12 matches than the school won in the prior seven seasons combined and fell one win shy of qualifying for the NCAA Tournament.

**Cael Sanderson**
Wrestling coach
Sanderson is the most accomplished amateur wrestler in history after compiling an unblemished 159-0 record, winning four consecutive NCAA championships and capturing the 2004 Olympic Gold Medal. He succeeds Hall of Famer Bobby Douglas.

**Jay Ronayne**
Gymnastics coach
After four seasons as the top assistant coach at Auburn University, where he helped lead the Tigers to an appearance in the NCAA Championships and coached three All-Americans, Ronayne is prepared to take the helm of the defending Big 12 Champion Cyclones.

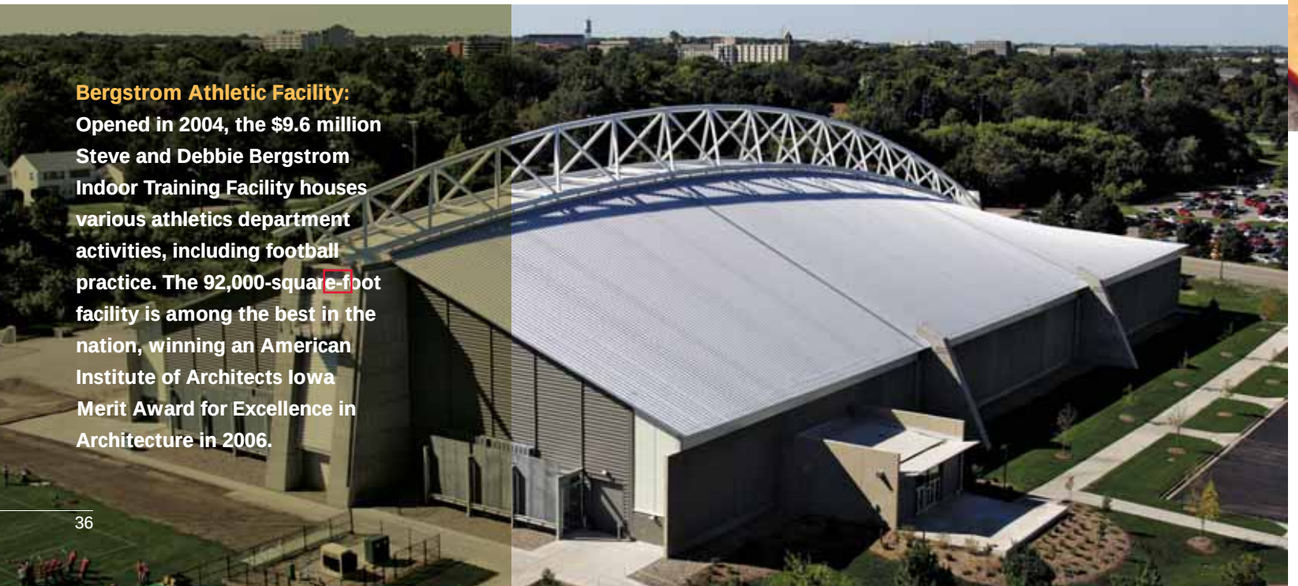
# leveling the playing field.


One of the next big steps for Iowa State athletics is improving the current facilities. Plans are being developed and funds being raised to make significant upgrades to two Cyclone landmarks.

## HILTON COLISEUM:

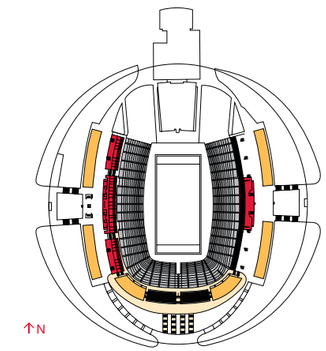
Iowa State's arena would undergo a major $60 million renovation and addition to include a new basketball/volleyball practice facility, and upgrades for fans throughout the facility, including suites and courtside seating areas. This is in addition to upgrades for the 2006-07 school year that include refurbishing more than 14,000 seats, installing a new scoreboard and ribbon board, and upgrading the sound system.

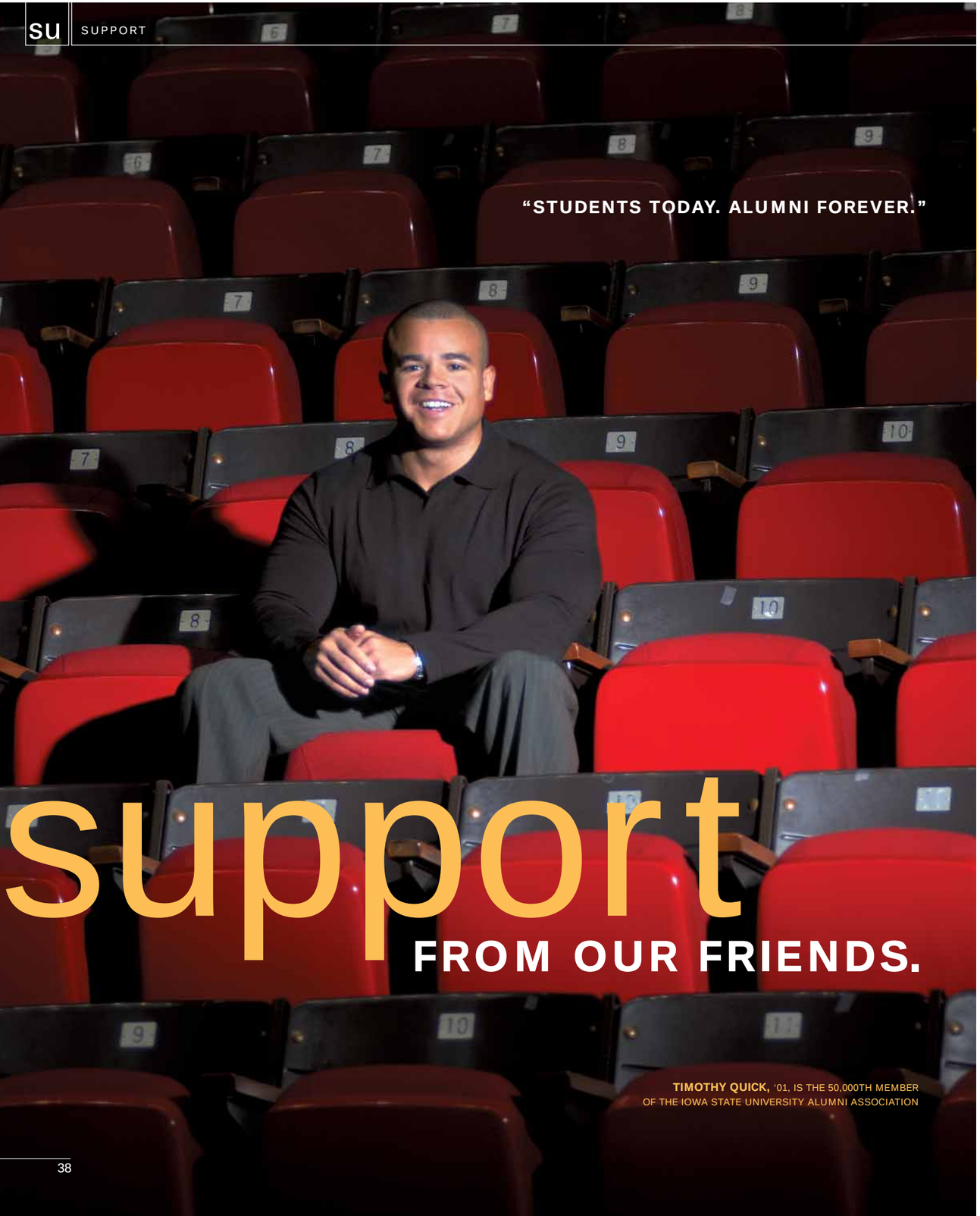


**Bergstrom Athletic Facility:** Opened in 2004, the $9.6 million Steve and Debbie Bergstrom Indoor Training Facility houses various athletics department activities, including football practice. The 92,000-square-foot facility is among the best in the nation, winning an American Institute of Architects Iowa Merit Award for Excellence in Architecture in 2006.

## JACK TRICE STADIUM:

A $35 million renovation is being proposed for the home of Cyclone football, bringing it more in line with the top college facilities in the Big 12 and throughout the Midwest. A highlight of the project would include creating a "U-shaped" bowl to add more seating around the south end zone and develop a more intimate, close-in effect. The renovated stadium will also mean more fan amenities, such as new concession and restroom areas, as well as new suites and an upgraded club section.






**TIMOTHY QUICK,** ’01, IS THE 50,000TH MEMBER OF THE IOWA STATE UNIVERSITY ALUMNI ASSOCIATION

## NURTURING AND GROWING THE UNIVERSITY.

Creating an environment for breakthroughs cannot be done alone. It takes partners who will nurture and develop support as well as build enthusiasm and commitments from people in Iowa and across the nation. The Iowa State University Alumni Association and the Iowa State University Foundation are key partners in the success of the university.

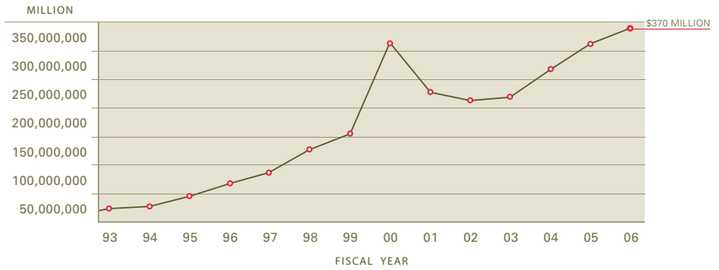
## IOWA STATE UNIVERSITY FOUNDATION

Philanthropy plays a major role at leading universities: offsetting rising tuition costs, endowing positions for leading faculty appointments, attracting the best and brightest students, and financing state-of-the-art facilities. At Iowa State University, the foundation is the private nonprofit organization dedicated to securing and stewarding gifts and grants to benefit the university.

Tens of thousands of generous benefactors make gifts to support Iowa State University each and every year. The foundation works closely with administrators and deans to determine fund-raising priorities. These include professorships, faculty support, student scholarships, facility improvements, new equipment, athletic support, program enhancements and several new buildings throughout the campus.

- Nearly $92 million in new gifts and commitments were received by the foundation during fiscal year 2006.
- During fiscal year 2005, a record number of donors – 55,279 – contributed to Iowa State University through the foundation.
- The foundation’s endowment totaled $370 million at the end of fiscal year 2006, a 54% increase from $240 million in 2003.
- Between 2002-2006, contributions through the foundation funded 95 endowed faculty positions.
- More than 3,800 students received scholarships through private support in 2006.
- The foundation’s emphasis on donor choice provides more than 3,000 different designations for contributions to the university.

### A HISTORY OF GROWTH FOR IOWA STATE UNIVERSITY FOUNDATION ENDOWMENT




IOWA STATE UNIVERSITY

## ALUMNI ASSOCIATION

Since 1878, the alumni association has played a unique and leading role within the Iowa State University community. Founded by members of the very first graduating class, the association has served the university from holding the patents of early inventions to serving as the first foundation.

Today, the alumni association continues to play a key collaborative role in the growth and success of Iowa State University. Forming strategic partnerships with the President’s Office, the Athletics Department, the foundation, colleges, Admissions Office, and others, the alumni association has taken an entrepreneurial approach to utilizing resources and funds, all in an effort to help people help the university.

The alumni association has set a record level of enlisting more than 50,000 members. This growth in numbers greatly strengthens the organization, making it the second largest in the Big 12 Conference. In fact, one out of every four living Iowa State alums is a member of the alumni association.

The new Alumni Center is on its way to becoming a reality at Iowa State University. The 32,400-square-foot building, funded entirely through private support, will be a key arrival point on the Ames campus. The $11.2 million facility will feature a visitor lounge and library, meeting and conference facilities, and new office space for the association staff. The center will also feature galleries on the traditions and innovations of Iowa State University, with four distinct displays on the university’s leadership, alumni, students, and inventions.

With more than 5,000 members, the Student Alumni Association is the number one program of its kind in the nation. Operating by its motto – “Students Today. Alumni Forever.” – the program helps to build pride and spirit among the largest pool of future alumni association members.

a look at where **Breakthroughs Happen.**

## Since 1858, Iowa State University has been a leader in higher education.

The nation's first land-grant university, Iowa State is home to more than 25,000 students and more than 6,000 faculty and staff members pursuing excellence in academics and research. Students from every state and more than 100 nations are enrolled in bachelor's, master's, doctoral, and professional degree programs.

## Accreditation

Iowa State University is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. In addition, 33 academic programs at Iowa State have specialized accreditation.

## Rankings

Iowa State University is one of America's Top 50 Public National Universities, according to *U.S.News & World Report*, the same magazine that recognized Iowa State as one of 25 universities for outstanding learning communities. Based on the university's commitment to community service, research and educating lower-income students, *Washington Monthly* has ranked Iowa State University 38th out of 245 national public and private universities. And the Association of University Technology Managers places Iowa State University 1st among all universities in licenses and options executed on its intellectual property.

## A great location

Ames, Iowa (population 50,731), is ranked as the second most livable small city in the nation by the *New Rating Guide to Life in America's Small Cities.*

## And located everywhere

Iowa State University Extension, begun in the late 1800s, engages people with research-based information about a variety of topics to improve the quality of life across the state. Today, Iowa State is the only university with an office and staff in each of Iowa's 99 counties.

## By the numbers

Operating revenues: $822,099,744 (FY 2005)
Endowment: $370,436,742 (FY 2006)
Annual grant funding: $287 million (FY 2005)
New gifts and commitments: $91,995,825 (FY 2006)
Students: 25,462 (Fall 2006)
Faculty and staff: 6,075
Living alumni: 200,885